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Title: Do thinking styles play a role in whether people pathologise their pornography use?

ABSTRACT

The concept of pornography addiction remains controversial and as such there are no diagnostic criteria. Despite this, individuals present to services with self-perceived problematic pornography use. Current treatment generally focuses on the pornography use, yet people's relationship with pornography is complex, and other factors may be relevant for therapy. Drawing on cognitive theory literature, this study explored whether thinking styles, influenced how people evaluate their pornography use. Self-reported (n = 265) “pornography addicts”, “somewhat pornography addicts”, and “non-addicts” were compared on their perceived effects of their pornography use, cognitive distortions, impact of religious beliefs, social desirability, and shame, within the values theory framework. Findings showed that groups differed significantly in their propensity for cognitive distortions, reported effects of their pornography use, the impact of their religious beliefs, and time spent viewing pornography. Significant differences were not found for the shame scales or social desirability. Regression analysis demonstrated that thinking styles mediated the relationship between time spent viewing pornography and the overall perceived negative impact of pornography. In light of this study's findings, thinking styles should be a focus in future research and treatment as it may help to reduce cognitive dissonance and engender agency.

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INTRODUCTION

Pornography, or porn, can be defined as "printed or visual material containing the explicit description or display of sexual organs or activity, intended to stimulate sexual excitement" (Oxford Dictionary, 2011). However, it is notoriously difficult to achieve an agreed definition. Since the advent of the internet, and the shift towards online pornography distribution, consumers have had more ubiquitous access to pornography than at any other time (Poulsen, Busby, & Galovan, 2013). Some researchers have argued that increased exposure can lead to an increased risk of sexual aggression and reduced sexual and relationship satisfaction for viewers (Malamuth, Addison, & Koss, 2000; Poulsen et al., 2013), and furthermore actors taking part in pornography can be vulnerable to being exploited, degraded, and sexualised (Kendall & Funk, 2004). Others view it as an increased opportunity for natural and beneficial sexual expression (Attwood, 2005, 2010). However, there is insufficient empirical evidence to support either claim (Weinberg, Williams, Kleiner, & Irizarry, 2010) and recent reviews of the literature pertaining to pornography use have identified methodological and conceptual shortcomings (Ferguson & Hartley, 2009; Ley, Prause, & Finn, 2014). Without adequate research to further our understanding of the complex relationship individuals have with pornography, we risk pathologising behaviours which are legal and consensual, condoning behaviours which may cause distress for some individuals, or even diverting attention from deeper issues such as an individual's thinking styles and feelings of shame. Clinically, difficulties may arise when the chosen viewpoint, which determines the content and extent of treatment offered to those who perceive their pornography use to be problematic, is based on subjective opinion rather than empirical evidence. Therefore, there is a responsibility for professionals to continue to engage with this debate.

Pornography addiction

"Pornography addiction" has not been accepted and classified as a psychological disorder, although research continues to investigate the effects of pornography use as a distinct sexual behaviour (Kafka, 2010). However, given there is no agreed diagnostic category for pornography addiction, there is disagreement amongst researchers regarding its definition, and a plethora of terms are used in this area,1 such as compulsive viewing (Cooper, Delmonico, GriffinShelley, & Mathy, 2004; Young, 2005), impulsive viewing (Shapira et al., 2003), excessive viewing (Pyle & Bridges, 2012), dependence (Cavaglion, 2009), and hypersexual disorder (Kafka, 2010; Kaplan & Krueger, 2010; Reid, Li, Gilliland, Stein, & Fong, 2011). How pornography addiction is operationalised, therefore, often varies between studies, and this influences the conclusions made about the impact of pornography addiction and about whether it actually exists at all. Indeed, a recent systematic literature review revealed stark disparities between the operational definitions of pornography addiction in different studies (Duffy, Dawson, & das Nair, 2016.). Broadly, definitions related to "excessive" use and negative consequences of use, yet arbitrary indices of "excessive", were often utilised. The variables used to operationalise pornography addiction and its impact were also found to be inadequate and simplistic, and as a result, the conclusions made in the studies were often misleading.

Regardless of the status of pornography addiction, individuals continue to seek treatment for their perceived problematic pornography use, separate from their other sexual behaviours (Reid et al., 2011; Reid, Harper, & Anderson, 2009). Despite over 100 years of scientific interest in sexuality and associated problems (Kafka, 2010), reasons for this remain unclear, for example, whether individuals experience a compulsion to behave in particular ways, or whether they pathologise their behaviours in response to negative consequences or feelings of shame. Furthermore, controversies remain regarding the agenda of research conducted and the use of biased definitions (Pope, Voges, Kuhn, & Bloxsome, 2007). Some critics have proposed that research in this area is entrenched in morality and religious values (Ley et al., 2014), and researchers condemn the sexual behaviour, rather than considering how an individual evaluates their sexual behaviour as problematic.

Viewing innate desires and behaviours against a backdrop of dominant moral and religious standards can be disempowering and shaming for some individuals (Ley et al., 2014). Indeed, it was not in the distant past that in the Western world "homosexuality" was considered abnormal based on dominant views about such sexuality, however, with rigorous research and advocacy, homosexuality has ceased to be considered a pathology. This demonstrates how the impact of cultural discourse, in the absence of research, can shape views and actions (sanctions) related to sexual practices that appear too subversive.

Moreover, pioneering research (Kinsey, Pomeroy, & Martin, 2003) suggested our individual desires and behaviours are likely to differ from those deemed acceptable as a society, yet we continue to judge them as one and the same. When we view individual behaviours through a societal lens and place global sanctions on them, we may run the risk of pathologising subversive, but largely "normal", non-coercive behaviours. Moreover, such an approach does not elucidate why some individuals can view pornography without perceiving it to be problematic, whilst others are distressed by their pornography use and seek treatment. Indeed, Kohut, Baer, and Watts (2015) highlighted that research related to pornography use often assumes that pornography addiction and broader negative effects are caused by the content of pornography alone; Murnen, Smolak, Mills, & Good, 2003), with relatively little research investigating how pornography users evaluate their pornography use and associated effects. Therefore, it is essential that attention is paid to individual factors that may be contributing to these differences, rather than assuming pornography itself has caused an individual to become a "pornography addict", in order to develop appropriate treatment, or offer help if needed, and disentangle misconceptions (Ley et al., 2014).

Theoretical framework: value theory

Perceived norms and values are central to various behaviours, meaning-making of these behaviours, and for understanding social-psychological phenomena (Schwartz & Bardi, 2001), including sexual behaviours (Goodwin et al., 2002). Research has shown that we hold a comprehensive, integrated, and stable set of motivational values which represent goals that apply across contexts and time and relate to fundamental, universal needs (Bardi & Schwartz, 2003); biological needs, requisites of coordinated social interaction, and demands of group survival and functioning (Schwartz, 2013). These values vary in their importance but apply across cultures and are expressed and/or pursued through behaviours.

The motivation and pursuit of each value has psychological, practical, and social consequences that may conflict or be congruent with the pursuit of other values (Bardi & Schwartz, 2003). The values and associated behaviours can be organised to reflect two overarching and conflicting dimensions: "openness to change" vs. "conservation", and "self-transcendence" vs. "self-enhancement". Pursued values situated at opposing dimensions are more likely to conflict with each other than values pursued from the same dimension. However, values are generally not conscious except in the presence of conflicting value-expressive behaviours (Schwartz, 2013). For example, some individuals' pornography use, as a behaviour expressing a hedonistic value, may lead to psychological pleasure, increased online expenditure, and reduced social activity. One or more of these consequences in turn may conflict with the pursuit of other values, for example, the

socially-related "conformity" value. Furthermore, experiences related to pornography use, such as ejaculation, may serve to reinforce the behaviour (Abramson & Pinkerton,1995) and, for those individuals who are conflicted, compound feelings of guilt and shame.

Values inform the evaluations we make about the self, others, behaviours, and events (Schwartz, 2012). Previous studies have found that if people and/or situations promote our values and related goals they are evaluated positively, whereas if they threaten the attainment of valued goals, they are evaluated negatively (Eccles & Wigfield, 2002). This process is further facilitated by our thinking styles, such as cognitive flexibility.

Cognitive flexibility is "the person's awareness that various situations and options may exist, the person's willingness to be flexible and adapt, and the person's belief about their self-efficacy in being flexible" (Hamtiaux & Houssemand, 2012, p. 565). Low cognitive flexibility is linked to rigidity, structure, rule adherence, and inflexibility regarding beliefs and attitudes towards behaviours (Hamtiaux & Houssemand, 2012). Indeed, rigid and dichotomous thinking dispositions have been evidenced in sexual addictive discourses relating to morally "good" vs. "bad" sex (Irvine, 1995; Keane, 2002). Using the theory to understand pornography addiction, if an individual's sexual behaviour conflicts with their inflexible beliefs, attitudes, and values, they may assign negative meaning to their pornography use. Research has shown this dissonance between behaviours and values can lead to distress and pathologising of behaviours (Musick, Blazer, & Hays, 2000).

Considerable research has demonstrated that cognitions greatly influence how we interpret situations and events (Beck, Freeman, & Davis, 2015; Millon & Davis, 1996). According to cognitive theorists, the content and process of these cognitions are associated with the particular activity (Beck, Rush, Shaw, & Emery, 1979). If someone resides within a community or culture in which the dominant discourse is that pornography is deviant (Attwood, 2007), they may interpret their pornography viewing as breaking an implicit rule and have thoughts such as "I shouldn't be watching porn" (content). Individuals with rigid thinking styles may also hold particular biases in the way they consider their pornography use, such as increased salience (Haselton, Byrant, Wilke, Frederick, Frankenhuis, Moore, 2009), whereby more weight is given to the times they use pornography than to the times when they are not using pornography (process), thus exacerbating their anxiety and conflict about that behaviour.

However, thinking styles are not pervasive to all situations, which raises the question of what it is about pornography use in particular. Dweck, Chiu, and Hong (1995) described people as having certain implicit theories that serve as an analytic framework through which information is encoded, interpreted, and responded to. These theories relate to people's assumptions about whether personal attributes are fixed or malleable. Each of the two assumptions has cognitive and behavioural consequences. Furthermore, such a cognitive style is not generalised but domain-specific. To illustrate, an individual who believes morality is a fixed trait may perceive their pornography use within that context (i.e. as a moral issue), whereas someone who believes morality is dynamic may be more likely to understand pornography-use behaviours as related to the user's "needs, goals, intentions, emotional states, [and/or] prior behaviours" (Dweck et al., 1995, p. 268).

As with Beckian cognitive theories, particular implicit theories, or assumptions, can lead to particular coping styles (Dweck et al., 1995). For instance, an individual who negatively evaluates their pornography use and holds the assumption that their personal attributes (e.g. morality) are fixed is more likely to feel helpless, whereas an individual holding the assumption that their personal attributes are malleable is more likely to believe in and pursue change. This is important for treatment given that hopelessness has been shown to mediate emotional wellbeing and treatment efficacy (Brent et al., 1998).

Clinical implications

Researchers acknowledge that people's relationship with pornography is complex (Hardy, 1998) and individuals experience it in different ways, for example, the time spent viewing pornography, the environment in which they view it, who they view it with, and the genre of pornography they watch (Attwood, 2005; Hald & Malamuth, 2008; Malamuth et al., 2000; Poulsen et al., 2013; Reid et al., 2011). Given that additional variables may be involved when (or why) people pathologise their pornography use, particularly rigidity of thinking (Reid et al., 2009), it is worth investigating such variables further to help discern differences between those who pathologise their pornography use and those who do not. This is important from a research and treatment perspective, as it may not be the behaviour itself (pornography use) that is problematic and the target for intervention, but the cognitive framework individuals use in relation to the behaviour.

Indeed, current clinical practices which address pornography use are not based on evidence or theory (Cash, Rae, Steel, & Winkler, 2012; Ley et al., 2014). Research should address this by investigating whether thinking styles, as identified in both the theoretical literature and clinical experience, affect whether people pathologise their pornography use. For instance, theoretically, clinicians may support "detoxification": there are approaches to this (e.g. 12step models) but they may have paradoxical effects (e.g. increasing shame) and it is not clear that the behaviour itself (pornography use) is problematic/"toxic". Instead, resources may be more effective directed towards alternate interventions that explore the way individuals develop their views and understanding of the self and others. One such alternative may be to work with thinking styles. If rigidity, inflexibility, and shame are linked with pathologising pornography use then treatment recommendations to address cognition styles and shame can be made, for instance, the role of compassion, challenging of assumptions, undermining problematic rule governance, diffusion, value clarification, and acceptance.

The notion that unhelpful thinking styles can change and be addressed in treatment is important to this study. If beliefs and attitudes impact on the way we view and adapt to our environment, then they may impact on the meaning we give to behaviours. Individuals with strict, rule-governed and moralistic attitudes may be more susceptible to shame and guilt. This study aims to explore whether these broader attitudes impact on the meaning given to pornography use. Therefore, we compared individuals who self-reported as pornography addicts ("addicts"), somewhat problematic pornography users ("some-what-addicts") and those who did not perceive their pornography use to be problematic ("non-addicts") on various sexual behaviours and psychological variables: thinking styles, shame, desirability responding, levels of religiosity, and perceived effects of pornography use.

Method

Recruitment occurred at both UK National Health Service (NHS) and non-NHS sites. For non-NHS participants, the questionnaires were made available online and advertised through social media. NHS recruitment occurred at a specialist sexual health clinic and was advertised using posters displayed in relevant clinical areas. The chief investigator informed participants of all aspects pertaining to participation in the study. Participants were provided with an information sheet about the study and were required to provide consent and confirm that they were above 18 years of age before continuing with the study. Participants were then asked to complete the questionnaires online.

Participants

Eligibility criteria included the requirement that all participants could provide informed consent and read and write English. People of all sexual orientations and genders were invited to participate. Due to the sensitive nature of the study, we only included those over 18 years of age and used pornography considered legal in the participants' country.3

Measures

Quantitative data were collected using a demographic questionnaire and four validated measures. Embedded within the study's text was a definition of "pornography". "Pornography addiction" was not defined as the participant's subjective understanding and experience was of primary interest. Total completion time was approximately 20 minutes.

Demographic Questions is the questionnaire about demographics and pornography-use characteristics was developed through an analysis of related literature. We asked participants their age, number of partners in the last year, sexual orientation, top five viewed pornography activities, sexual acts performed whilst watching pornography, relationship status, the amount of time spent viewing pornography, and age participants first had sex (Table 1).

Given that research suggests that level of religiosity is associated with seeking treatment for pornography use and its conflict with religious values (Twohig, Crosby, & Cox, 2009; Winters et al., 2009), we asked participants to rate how much their religious beliefs impacted on their day-to-day life using a 4point Likert-scale (1 = not at all, 4 = very much).

The Inventory of Cognitive Distortions (ICD; Yurica & DiTomasso, 2001) is a 69item measure of cognitive distortions based on 11 factors that emerged from the original factor analysis. Participants rated agreement with statements such as "I have a tendency to blame myself for bad things" using a 5point Likert-scale (1 = never think or feel this way, 5 = always think or feel this way). Uhl (2007) reported high internal consistency (a = .97) for this measure. Higher scores indicate a higher frequency of dysfunctional cognitive processes such as rigidity of thinking.

The Test of Self-Conscious Affect3 (TOSCA3; Tangney, Dearing, Wagner & Gramzow, 2000) uses 15 scenarios to assess shame-proneness, guilt-proneness, externalisation, and detachment/unconcern. Participants rated their responses for each scenario using a 5point Likert-scale (1 = not likely, 5 = very likely). Reliability coefficients for the TOSCA3 subscales range from .60 to .80 (Tangney & Dearing, 2002; Wolf, Cohen, Panter & Insko, 2010). Higher scores of each component indicate higher levels of those components.

The Balanced Inventory of Desirable Responding (BIDR6; Paulhus, 1991; 1998) was used to minimise the potential effects that social desirability and impression management may have on the disclosure of sensitive sexual information (Meston, Heiman, Trapnell, & Paulhus, 1998). Given that those who pathologise their sexual behaviours may do so because they perceive them to be outside of social norms, accounting for this bias is imperative (Guerra et al., 2012).

Table 1. Demographic information sorted by addiction status and gender.

Reported addiction status and gender	Top 5 viewed pornography activities*	Top act whilst watching pornography	Previous sexual experience	Relationship status**	Sexual orientation***
Non-addicts (n = 184) (mean age = 27; range = 18–64)	Lesbian (52%) Amateur (48%) Threesome (41%) Anal (35%) BDSM (30%)	Masturbate (76%)	Mean age = 18 (30%) 19% have never had sex	Single (40%) Monogamous relationship (38%) Married (16%) Non-monogamous relationship (4%)	72% Heterosexual 16% Bisexual 7% Lesbian/ gay
Somewhat-addicts (n = 34) (mean age = 28; range = 18–60)	Amateur (53%) Lesbian (35%) Anal (33%) Hard-core (32%) Blowjob (30%) Gangbang (30%) Gay (30%)	Masturbate (77%)	Mean age = 18 (27%) 21% have never had sex	Single (50%) Monogamous relationship (24%) Married (18%) Non-monogamous relationship (9%)	82% Heterosexual 15% Bisexual 3% Lesbian/ gay
Addicts (n = 47) (mean age = 28 range = 18–58)	Lesbian (62%) Amateur (60%) HD Pornography (57%) Pornstar (49%) Blowjob (45%)	Masturbate (87%)	Mean age = 16 or 18 (13%) 17% have never had sex	Single (62%) Married (21%) Monogamous relationship (13%)	92% Heterosexual 4% Bisexual 2% Lesbian/ gay
Female (n = 112)	Lesbian (51%) Threesome (42%) For Women (38%) BDSM (34%) Masturbation (30%)	Masturbate (66%)	Mean age = 24 (24%) 10% have never had sex	Monogamous relationship (44%) Single (37%) Married (14%) Non-monogamous relationship (5%)	
Male (n = 153)	Amateur (59%) Lesbian (52%) Anal (44%) HD Pornography (39%) POV (37%)	Masturbate (86%)	Mean age = 18 (18%) 16% have never had sex	Single (52%) Monogamous relationship (23%) Married (19%) Non-monogamous relationship (4%)	
Total (n = 265) (mean age = 27; age range = 18–64)	Lesbian (52%) Amateur (52%) Threesome (39%) Anal (36%) Blowjob (32%)	Masturbate (78%)	Mean age = 18 (17%) 13% have never had sex	Single (45%) Monogamous relationship (38%) Married (17%) Non-monogamous relationship (4%)	

*Participants were able to provide multiple responses and so percentages do not equate to a total of 100.
**Due to rounding percentages do not total 100%.
*** The majority of participants had one partner in the last year.

The BIDR-6 comprises 40 items that assess whether an individual's response style is likely to be distorted by social desirability or impression management. Participants rated agreement with statements such as "I have not always been honest with myself" using a 7-point Likert-scale (1 = not true, 7 = very true). Paulhus (1991) found good reliability for the self-deceptive enhancement subscale (α = .68–.80) and for impression management (α = .75–.86). Higher scores indicate higher levels of social desirability or impression management.

Pornography Consumption Effects Scale (PCES; Hald & Malamuth, 2008) uses 47 items to measure self-perceived positive and negative effects of pornography use on sexual behaviours and attitudes. Participants rated agreement to statements such as "To what extent do you believe that your consumption of pornography: Has taught you new sexual techniques?" using a 7-point Likert-scale (1 = not at all, 7 = to an extremely large extent). Reliability coefficients for the PCES and its subscales range from .82 to .91 (Hald & Malamuth, 2008). An overall positive effect dimension (PED) and negative effect dimension (NED) were measured based on the following constructs: sex life, life in general, perception of and attitudes towards the opposite gender, attitudes towards sex, and sexual knowledge. For the purpose of this study, an additional construct, perception of and attitudes towards the same gender, was created to accommodate participants of varying sexual orientations. Higher scores indicate a stronger expression of the constructs.

Results

Participants (n = 265) were divided into three groups: Group 1 – addicts, Group 2 – somewhat-addicts, and Group 3 – non-addicts. Demographic data are shown in Table 1. Groups did not significantly differ in their relationship status or for gender overall, although there were significantly more male addicts than females.

Principal components analysis (PCA)

To assess how the ICD best fit the sample, a PCA was conducted. Analysis yielded statistically significant findings for the internal structure of the scale. Five factors were ultimately retained (externalisation of self-worth; magnification and fortune telling; minimisation and arbitrary inferences; perfectionism; emotional reasoning).

Group differences

A one-way ANOVA was conducted to compare the effect of group membership (independent variable (IV): reported addiction status) on the monthly average amount of time spent viewing pornography (dependent variable (DV): time spent viewing pornography). There was a significant effect of reported problematic pornography use on time spent watching pornography ($F_{(2, 258)} = 24.27$; $p < .001$). Post-hoc comparisons using the Tukey HSD test indicated that addicts were significantly more likely to view pornography for a longer period of time (M = 1934.33, SD = 1602.90) when compared to non-addicts (M = 240.42, SD = 345.48) and somewhat-addicts (M = 717.79, SD = 994.76). There were no significant differences in viewing times between non-addicts and somewhat-addicts. In other words, these results suggest that the more time spent watching pornography, the more likely people were to identify as a problematic pornography user.

To assess for group differences (IV: reported addiction status) between the five measures (DVs: PCES, TOSCA, BIDR-6, ICD, and impact of religious beliefs), a MANOVA was conducted. Of the overall differences between groups, the ICD and PCES measures, and the impact of religious beliefs variable yielded significant results (Wilks' λ = 0.374; $F_{(21, 243)} = 19.36$; $p < 0.001$). Table 2 shows that group membership had a statistically significant effect on whether participants reported positive ($F_{(2, 262)} = 5.81$; $p < .005$; partial

Table 2. Significant multivariate effects of self-reported addiction status.

Dependent variable	Mean square	df	*F*	Sig.	Partial eta squared	Observed power
Positive effects of pornography on life in general (PCES)	10.125	2	*5.81	.003	.042	.87
Negative effects of pornography on life in general (PCES)	36.24	2	**16.3	.001	.577	1.00
Negative perceptions of members of the opposite sex (PCES)	48.01	2	**25.97	.001	.165	1.00
Negative perceptions of members of the same sex (PCES)	22.99	2	**15.19	.001	.104	1.00
Negative attitudes towards sex (PCES)	70.79	2	**62.03	.001	.321	1.00
Positive effects on sex life (PCES)	13.10	2	*5.78	.003	.042	.87
Negative effects on sex life (PCES)	109.52	2	**133.94	.001	.506	1.00
Total negative effects score (PCES)	123.59	2	**141.42	.001	.519	1.00
Total cognitive distortions (ICD)	46019.38	2	**23.33	.001	.151	1.00
Externalisation of self-worth (ICD)	15244.60	2	**22.25	.001	.145	1.00
Magnification and fortune-telling (ICD)	2105.77	2	**12.73	.001	.089	.997
Minimisation and arbitrary inferences (ICD)	931.80	2	**24.16	.001	.156	1.00
Perfectionism (ICD)	747.56	2	**12.01	.001	.084	.995
Emotional Reasoning (ICD)	171.45	2	*6.50	.002	.047	.905
How much do your religious beliefs affect your daily life?	10.804	2	**13.07	.001	.091	1.00

Note: PCES = Porn Consumption Effects Scale; ICD = Inventory of Cognitive Distortions scale.
*Significant at the $p < 0.05$ level.
**Significant at the $p < 0.001$ level.

$\eta 2 = 42$), or negative effects of pornography consumption on their life in general ($F_{(2, 262)} = 36.24$; $p < .001$; partial $\eta 2 = .58$). How participants viewed their pornography use also related to whether they viewed members of the opposite sex more negatively ($F_{(2, 262)} = 25.97$; $p < .001$; partial $\eta 2 = .17$), viewed members of the same sex more negatively ($F_{(2, 262)} = 15.19$; $p < .001$; partial $\eta 2 = .10$), or held negative attitudes towards sex ($F_{(2, 262)} = 62.03$; $p < .001$; partial $\eta 2 = .32$). There was also a significant relationship between group membership and reported positive effects ($F_{(2, 262)} = 5.78$; $p < .05$; partial $\eta 2 = .04$), and negative effects of pornography of participants' sex life ($F_{(2, 262)} = 133.94$; $p < .001$; partial $\eta 2 = .51$). Furthermore, self-reported level of problematic pornography use was significantly related to whether pornography consumption had an overall negative effect ($F_{(2, 262)} = 141.40$; $p < .001$; partial $\eta 2 = .52$). Finally, self-defined pornography use was significantly associated with participants' thinking styles, specifically their total ICD scores ($F_{(2, 262)} = 23.33$; $p < .001$; partial $\eta 2 = .15$) and its five factors, and how much religious beliefs affected their daily lives ($F_{(2, 262)} = 13.07$; $p < .05$; partial $\eta 2 = .09$). Significant differences were not found for the shame scales (as measured by the TOSCA-3), or for social desirability or impression management (as measured on the BIDR-6).

Post-hoc analyses

Given the statistically significant MANOVA test, *post-hoc* univariate tests were conducted (see Table 3). Specifically, ANOVA tests were conducted on all 15 significant contrasts to assess the direction of significant effects.[4]

Post-hoc Tukey HSD analyses (see Table 4) showed that addicts were significantly more likely to report higher negative effects of pornography use than somewhat-addicts and

Table 3. Comparison of mean scores for participants who perceived their pornography use to be problematic, somewhat problematic, and not problematic.

Variable	Group							
	Non-addicts		Somewhat-addicts		Addicts			
	Mean	SD	Mean	SD	Mean	SD	*F*	Eta-squared.
Positive effects of pornography on life in general (PCES)	2.50	1.29	2.56	1.44	1.79	1.33	*5.81	.04
Negative effects of pornography on life in general (PCES)	1.51	.87	2.97	1.51	5.15	1.88	**178.50	.58
Negative perceptions of members of the opposite sex (PCES)	1.85	1.14	2.62	1.37	3.50	2.00	**25.97	.17
Negative perceptions of members of the same sex (PCES)	1.89	1.09	2.35	1.28	2.98	1.66	**15.19	.10
Negative attitudes towards sex (PCES)	1.61	.91	2.32	1.17	3.53	1.49	**62.03	.32
Positive effects on sex life (PCES)	3.20	1.50	3.03	1.49	2.36	1.55	*5.78	.04
Negative effects on sex life (PCES)	1.63	.76	2.32	.91	4.04	1.33	**133.94	.51
Total negative effect score (PCES)	1.52	.78	2.41	.89	4.06	1.40	**141.40	.52
Externalisation of self-worth (ICD)	83.05	1.93	91.82	4.49	111.47	3.82	**22.25	.15
Magnification and fortune-telling (ICD)	24.36	.67	26.38	1.56	31.85	1.33	**12.73	.09
Minimisation and arbitrary inferences (ICD)	15.27	.32	17.88	.75	20.04	.641	**24.16	.16
Perfectionism (ICD)	19.71	.41	22.29	.96	23.92	.81	**12.00	.08
Emotional Reasoning (ICD)	13.03	.27	13.35	.62	15.17	.53	**6.50	.05
How much do your religious beliefs affect your daily life?	1.43	.79	1.97	1.11	2.11	1.15	**13.07	.09
Total cognitive distortions (ICD)	168.40	44.04	185.38	39.40	217.60	49.08	**23.33	.15

Note: PCES = Porn Consumption Effects Scale; ICD = Inventory of Cognitive Distortions scale.
*Significant at the $p < 0.05$ level
**Significant at the $p < 0.001$ level

non-addicts. The same group were also more likely to display increased dysfunctional thinking styles (as measured by the ICD) and experience a greater impact of their religious beliefs.

Somewhat-addicts reported similar scores for two of the PCES subscales (positive effect of pornography on life in general; perceptions of the same sex) and for the ICD total score, as non-addicts and they were not significantly different from addicts in how much their religious beliefs impacted on their daily lives. For all other measures, somewhat-addicts differed significantly from the other two groups.

Multinomial regression

Multinomial logistic regression (MLR) is well suited for testing the relationship between a categorical DV and one or more categorical or continuous IV. Therefore, this approach was used to examine which measures (IV) predicted group membership (DV). Participants who defined themselves as addicts or somewhat-addicts were contrasted with non-addicts.[5]

A chi-square test was performed to determine whether the different IVs were equally preferred (see Table 5). Preference for the IVs was not equally distributed in the population, X^2 ($_{20}$, $N = 193.53$) = 4.53, $p < .05$. This showed that self-reported addiction status could be predicted using the IVs (see Table 6).

According to the MLR model, negative impact of pornography on participants' life in general, sex life, their dysfunctional thinking styles (overall and externalisation of self-

Table 4. Differences between mean scores for participants who perceived their pornography use to be problematic, somewhat problematic, and not problematic.

Life in general—positive						
					95% Confidence interval	
(I) Self-reported addiction status	(J) Self-reported addiction status	Mean difference (I-J)	Std. Error	Sig.	Lower bound	Upper bound
Non-addicts	Somewhat-addicts	−.06	.246	.969	−.64	.52
	Addicts	*.71	.216	.003	.20	1.22
Somewhat-addicts	Non-addicts	.06	.246	.969	−.52	.64
	Addicts	*.77	.297	.027	.07	1.47
Addicts	Non-addicts	*−.71	.216	.003	−1.22	−.20
	Somewhat-addicts	*−.77	.297	.027	−1.47	−.07
Life in general—negative						
Non-addicts	Somewhat-addicts	**−1.46	.223	.001	−1.99	−.93
	Addicts	**−3.64	.196	.001	−4.10	−3.18
Somewhat-addicts	Non-addicts	**1.46	.223	.001	.93	1.99
	Addicts	**−2.18	.269	.001	−2.81	−1.54
Addicts	Non-addicts	**3.64	.196	.001	3.18	4.10
	Somewhat-addicts	**2.18	.269	.001	1.54	2.81
Perception of opposite sex – negative						
Non-addicts	Somewhat-addicts	*−.76	.254	.008	−1.36	−.17
	Addicts	**−1.55	.222	.001	−2.07	−1.03
Somewhat-addicts	Non-addicts	*.76	.254	.008	.17	1.36
	PAs	*−.79	.306	.029	−1.51	−.07
Addicts	Non-addicts	**1.55	.222	.001	1.03	2.07
	Somewhat-addicts	*.79	.306	.029	.07	1.51
Perception of same sex—negative						
Non-addicts	Somewhat-addicts	−.46	.230	.112	−1.00	.08
	PAs	**−1.09	.201	.001	−1.56	−.61
Somewhat-addicts	Non-addicts	.46	.230	.112	−.08	1.00
	Addicts	−.63	.277	.063	−1.28	.03
Addicts	Non-addicts	**1.09	.201	.001	.61	1.56
	Somewhat-addicts	.63	.277	.063	−.03	1.28
Attitudes towards sex—negative						
Non-addicts	Somewhat-addicts	**−.72	.199	.001	−1.18	−.24
	Addicts	**−1.92	.175	.001	−2.33	−1.51
Somewhat-addicts	Non-addicts	**.72	.199	.001	.24	1.18
	Addicts	**−1.21	.241	.001	−1.78	−.64
Addicts	Non-addicts	**1.92	.175	.001	1.51	2.33
	Somewhat-addicts	**1.21	.241	.001	.64	1.78
Sex life—positive						
Non-addicts	Somewhat-addicts	.17	.282	.815	−.49	.84
	Addicts	*.84	.247	.002	.26	1.42
Somewhat-addicts	Non-addicts	−.17	.282	.815	−.84	.49
	Addicts	.67	.340	.123	−.13	1.47
Addicts	Non-addicts	*−.84	.247	.002	−1.42	−.26
	Somewhat-addicts	−.67	.340	.123	−1.47	.13
Sex life—negative						
Non-addicts	Somewhat-addicts	**−.69	.169	.001	−1.09	−.30
	Addicts	**−2.41	.148	.001	−2.76	−2.06
Somewhat-addicts	Non-addicts	**.69	.169	.001	.30	1.09
	Addicts	**−1.72	.204	.001	−2.20	−1.24
Addicts	Non-addicts	**2.41	.148	.001	2.06	2.76
	Somewhat-addicts	**1.72	.204	.001	1.24	2.20
Total negative effect score (PCES)						
Non-addicts	Somewhat-addicts	**−.90	.175	.001	−1.31	−.48
	Addicts	**−2.55	.153	.001	−2.91	−2.19
Somewhat-addicts	Non-addicts	**.90	.175	.001	.48	1.31
	Addicts	**−1.65	.210	.001	−2.15	−1.16
Addicts	Non-addicts	**2.55	.153	.001	2.19	2.91

(*continued*)

Table 4. (*Continued*)

Life in general—positive						
					95% Confidence interval	
(I) Self-reported addiction status	(J) Self-reported addiction status	Mean difference (I-J)	Std. Error	Sig.	Lower bound	Upper bound
	Somewhat-addicts	**1.65	.210	.001	1.16	2.15
ICD TOTAL						
Non-addicts	Somewhat-addicts	−16.98	8.292	.103	−36.52	2.56
	Addicts	**−49.19	7.259	.001	−66.30	−32.08
Somewhat-addicts	Non-addicts	16.98	8.292	.103	−2.56	36.52
	Addicts	*−32.21	10.000	.004	−55.79	−8.64
Addicts	Non-addicts	**49.19	7.259	.001	32.08	66.30
	Somewhat-addicts	*32.21	10.000	.004	8.64	55.79
Externalisation of self-worth (ICD)						
Non-addicts	Somewhat-addicts	−8.77	4.89	.173	−20.29	2.75
	Addicts	**−28.41	4.28	.001	−38.50	−18.33
Somewhat-addicts	Non-addicts	8.77	4.89	.173	−2.75	20.29
	Addicts	*19.64	5.89	.003	−33.54	−5.75
Addicts	Non-addicts	**28.41	4.28	.001	18.33	38.50
	Somewhat-addicts	*19.64	5.89	.003	5.75	33.54
Magnification and fortune-telling (ICD)						
Non-addicts	Somewhat-addicts	−2.02	1.70	.461	−6.02	1.98
	Addicts	**−7.49	1.49	.001	−10.99	−3.98
Somewhat-addicts	Non-addicts	2.02	1.770	.461	−1.98	6.02
	Addicts	*−5.47	2.05	.022	−10.30	−.64
Addicts	Non-addicts	**7.49	1.49	.001	3.98	10.99
	Somewhat-addicts	*5.47	2.05	.022	.64	10.30
Minimisation and arbitrary inferences (ICD)						
Non-addicts	Somewhat-addicts	*−2.61	.82	.005	−4.54	−.68
	Addicts	**−4.77	.72	.001	−6.46	−3.08
Somewhat-addicts	Non-addicts	*2.61	.82	.005	.68	4.54
	Addicts	−2.16	.99	.076	−4.49	.17
Addicts	Non-addicts	**4.77	.71	.001	3.08	6.46
	Somewhat-addicts	2.16	.99	.076	−.17	4.49
Perfectionism (ICD)						
Non-addicts	Somewhat-addicts	*−2.58	1.04	.037	−5.03	−.12
	Addicts	**−4.20	.91	.001	−6.35	−2.05
Somewhat-addicts	Non-addicts	*2.58	1.04	.037	.12	5.03
	Addicts	−1.62	1.26	.402	−4.58	1.34
Addicts	Non-addicts	**4.20	.91	.001	2.05	6.35
	Somewhat-addicts	1.62	1.26	.402	−1.34	4.58
Emotional reasoning (ICD)						
Non-addicts	Somewhat-addicts	−.32	.68	.884	−1.92	1.28
	Addicts	**−2.14	.59	.001	−3.54	−.74
Somewhat-addicts	Non-addicts	.32	.68	.884	−1.28	1.92
	Addicts	−1.82	.82	.069	−3.74	.11
Addicts	Non-addicts	**2.14	.59	.001	.74	3.54
	Somewhat-addicts	1.82	.82	.069	−.11	3.74
How much do your religious beliefs affect your daily life?						
Non-addicts	Somewhat-addicts	*−.54	.170	.005	−.94	−.14
	Addicts	**−.67	.149	.001	−1.02	−.32
Somewhat-addicts	Non-addicts	*.54	.170	.005	.14	.94
	Addicts	−.14	.205	.785	−.62	.35
Addicts	Non-addicts	**.67	.149	.001	.32	1.02
	Somewhat-addicts	.14	.205	.785	−.35	.62

Note. PCES = Porn Consumption Effects Scale; ICD = Inventory of Cognitive Distortions scale.
*Significant at the $p < 0.05$ level.
**Significant at the $p < 0.001$ level.

Table 5. Model fitting information: group membership.

Model fitting information				
Model	−2 log likelihood	Chi-square	Df	Sig.
Intercept only	436.45			
Final	223.03	213.43	30	.001

worth, magnification and fortune telling, minimisation and arbitrary inferences, and perfectionism), and impact of religious beliefs were positively related to group membership ($p < .05$).

The variables that statistically distinguished addicts from non-addicts, in the first logistic regression equation, were negative impact of pornography on participants' sex life (SLN), dysfunctional thinking styles (overall and externalisation of self-worth, magnification and fortune telling, minimisation and arbitrary inferences, and perfectionism), and impact of religious beliefs. The variables that statistically distinguished somewhat-addicts from non-addicts, in the first logistic regression equation, were negative impact of pornography on participants' life in general.

Odds ratio analyses demonstrated that for each unit increase in pornography consumption having a negative effect on their sex life, the probability of identifying as an addict increased by 401%. For each unit increase in the impact of their religious beliefs, the probability of identifying as an addict increased by 186%. The probability of participants reporting to be addicts for each unit increase in overall cognitive distortions increased by 39%, externalisation of self-worth by 75%, magnification and fortune telling by 56%, minimisation and arbitrary inferences by 923%, and perfectionism by 105%. For each unit increase in pornography consumption having a negative effect of their life in general, the probability of identifying as a some-what addict rose by 179%.

Mediation

Regression analysis was used to investigate the hypothesis that thinking styles (as measured by the ICD and impact of religious beliefs) mediated the effect of time spent viewing pornography on the overall negative effect of pornography. Confidence intervals were examined to assess this (Preacher & Kelley, 2011).

As Figure 1 illustrates, there was a significant indirect effect of frequency of viewing on negative effects of pornography through cognitive thinking styles, $b = .10$, BCa CI[.0402, .1865]. The indirect effect is approximately 10% of the maximum value that it could have been, and equates to a medium effect size, $K^2 = .10$, CI[.0415, .1834].

As Figure 2 illustrates, there was a significant indirect effect of frequency of viewing on negative effects of pornography through the impact of religious beliefs, $b^2 = .04$, BCa CI [.0044, .0885]. The indirect effect is approximately 4% of the maximum value that it could have been, and equates to a medium effect size, $K^2 = .04$, CI[.0067, .0881].

Discussion

In exploring whether thinking styles play a role in how individuals evaluate their pornography use, several significant findings emerged. Thinking styles, impact of religious beliefs, and positive and negative perceived effects of pornography use were found to differ

Table 6. Multinomial logistic regression analysis of participants' thinking styles and effects of pornography use.

	Predictor	*B*	SE β	Wald's $\chi 2$ (df = 1)	*Df*	Predictor e β (odds ratio)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
Somewhat-addicts								
	Positive effects of pornography on life in general (PCES)	.157	.203	.595	1	1.169	.786	1.741
	Negative effects of pornography on life in general (PCES)	1.028	.333	9.524	1	2.794*	1.455	5.367
	Negative perceptions of members of the opposite sex (PCES)	.161	.224	.513	1	1.174	.756	1.824
	Negative perceptions of members of the same sex (PCES)	−.043	.207	.043	1	.958	.639	1.437
	Negative attitudes towards sex (PCES)	−.266	.344	.595	1	.767	.390	1.506
	Positive effects on sex life (PCES)	−.177	.199	.796	1	.838	.568	1.236
	Negative effects on sex life (PCES)	.013	.467	.001	1	1.013	.406	2.527
	PCES total negative score (PCES)	−.120	.657	.034	1	.887	.245	3.213
	Cognitive distortions (ICD)	−.094	.123	.586	1	.910	.715	1.159
	Externalisation of self-worth (ICD)	.104	.126	.674	1	1.109	.866	1.420
	Magnification and fortune telling (ICD)	.053	.143	.139	1	1.054	.797	1.394
	Minimisation and arbitrary inferences (ICD)	.250	.158	2.487	1	1.284	.941	1.751
	Perfectionism (ICD)	.197	.148	1.783	1	1.218	.912	1.628
	Emotional reasoning (ICD)	.014	.169	.007	1	1.014	.728	1.413
	How much do your religious beliefs affect your daily life?	.431	.242	3.172	1	1.539	.958	2.475
Addicts								
	Positive effects of pornography on life in general (PCES)	−.177	.333	.283	1	2.863	.436	.436
	Negative effects of pornography on life in general (PCES)	.687	.390	3.102	1	.837	.925	.925
	Negative perceptions of members of the opposite sex (PCES)	.001	.309	.001	1	1.988	.546	.546
	Negative perceptions of members of the same sex (PCES)	.223	.266	.702	1	1.001	.742	.742
	Negative attitudes towards sex (PCES)	−.819	.469	3.051	1	1.250	.176	.176
	Positive effects on sex life (PCES)	−.339	.270	1.579	1	.441	.420	.420
	Negative effects on sex life (PCES)	1.612	.667	5.840	1	.712	1.356	1.356
	PCES total negative score (PCES)	.558	.965	.335	1	5.010	.264	.264
	Cognitive distortions (ICD)	−.493	.207	5.674	1	1.748*	.407	.407
	Externalisation of self-worth (ICD)	.558	.218	6.528	1	.611*	1.139	1.139
	Magnification and fortune telling (ICD)	.445	.224	3.928	1	1.747*	1.005	1.005

(*continued*)

Table 6. (*Continued*)

Predictor	*B*	SE β	Wald's $\chi 2$ (df = 1)	*Df*	Predictor e β (odds ratio)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
Minimisation and arbitrary inferences (ICD)	.652	.257	6.438	1	1.560*	1.160	1.160
Perfectionism (ICD)	.716	.256	7.845	1	1.920*	1.240	1.240
Emotional reasoning (ICD)	.465	.275	2.870	1	1.591	.930	2.727
How much do your religious beliefs affect your daily life?	1.052	.345	9.275	1	2.863*	1.455	5.634

Note. PCES = Porn Consumption Effects Scale; ICD = Inventory of Cognitive Distortions scale.
*Significant at the $p < 0.05$ level.
**Significant at the $p < 0.001$ level.

depending on how individuals defined their pornography use as being problematic or not. Given that addicts viewed pornography for a significantly longer period of time than somewhat-addicts or non-addicts, a propensity score-matching (PSM) sensitivity analysis was performed. When this sample was analysed for differences, findings reflected those found in the larger sample, indicating that cognitive bias is likely to influence how individuals evaluate their pornography use, rather than the behaviour alone. Therefore, generally, non-addicts were more likely to report experiencing positive effects from their pornography use, whereas addicts were more likely to report experiencing negative effects from their pornography use. Addicts were more likely to report higher levels of cognitive distortions, specifically externalisation of self-worth, magnification and fortune telling,

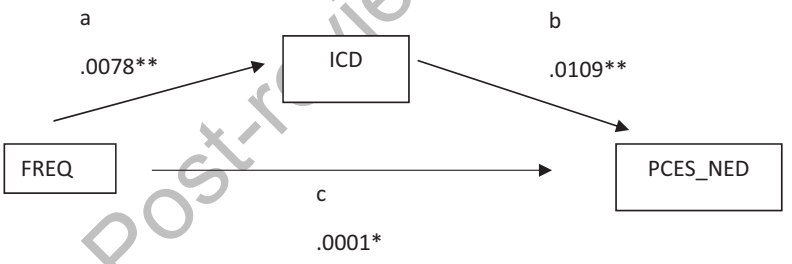

Figure 1. Standardised regression coefficients for the relationship between frequency of pornography use and negative effects of pornography consumption as mediated by cognitive styles.
*$P < .05$**$p < .001$

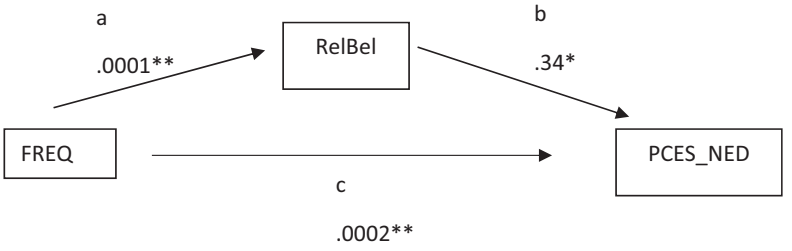

Figure 2. Standardised regression coefficients for the relationship between frequency of pornography use and negative effects of pornography consumption as mediated by impact of religious beliefs.
*$P < .05$**$p < .001$

minimisation and arbitrary inferences, perfectionism, and emotional reasoning, than non-addicts or somewhat-addicts. Addicts and somewhat-addicts were more likely to report that their religious beliefs impacted their daily lives more than non-addicts. Further analyses revealed that individuals who demonstrated a propensity for dysfunctional thinking and experienced their religious beliefs as impacting on their daily lives, were more likely to identify as an addict. Shame was not found to be associated with how participants viewed their pornography use.

Thinking styles

In support of our hypothesis, cognitive distortions were found to predict how participants evaluated their pornography use, specifically identifying as an addict, and reporting negative effects of pornography consumption on their sex life, attitudes towards sex, and life in general. Further analyses showed that individuals who demonstrated increased dysfunctional thinking styles, and/or experienced a high impact of religious beliefs, were more likely to report negative effects of their pornography use in relation to life in general and sexual factors, and were more likely to perceive themselves as addicted to pornography.

How people give meaning to their own and other people's behaviours is subject to cognitive errors and attribution biases (Brehm, Kassin, & Fein, 2002). We can speculate then that some cognitive distortions may be more relevant than others with regards to evaluating one's pornography use. For instance, "externalisation of self-worth" refers to the development and maintenance of self-worth based almost exclusively on how the external world views that individual (Freeman, 2004; Freeman & Oster, 1999). If individuals are within an environment that perceives pornography use to be unhealthy or harmful, then those individuals may evaluate their own pornography use negatively based on those external judgements. Similarly, if individuals have a propensity for "emotional reasoning", in environments where pornography use is a taboo or shameful, they may conclude that feelings of guilt about their pornography use is evidence of being guilty. Furthermore, if an individual has "perfectionistic" traits, they may be constantly striving to compete with internal or external representations of "perfection". In relation to pornography use, this representation may be defined by society or a culture and be incongruent with the individual's actual behaviours, leading them to perceive those behaviours as "wrong". Additionally, if individuals hold a cognitive distortion of "magnification" they may have a tendency to exaggerate or magnify the negative consequences of their own pornography use in comparison to other people's pornography use (Burns, 1999; Burns & Seligman, 1989). Finally, individuals with frequent cognitive distortions may rely on "arbitrary inferences", whereby they draw a negative conclusion in the absence of specific supportive evidence (Beck et al., 1979; Burns, 1999; Burns & Seligman, 1989) (e.g. "I use pornography more than others, therefore I am an addict"). In the current study, addicts were found to significantly endorse these types of cognitive distortions more than somewhat-addicts or non-addicts.

Cognitive distortions, in part, are demonstrative of cognitive rigidity and inflexibility (Marzuk, Hartwell, Leon, & Portera, 2005). When people experience cognitive dissonance, i.e. a state of stress when holding two or more conflicting thoughts, attitudes, beliefs or values (Festinger, 1962), particularly when related to the concept of self (Aronson, 1999),

it is cognitive flexibility which determines how that discomfort is managed. Individuals with cognitive flexibility may initially hold conflicting attitudes or beliefs about their pornography use, but cope with this by accepting that they use pornography, and alter their existing belief system to accommodate their pornography use as being acceptable, thus identifying as a non-addicted user.

Values theory emphasises this dissonance between behaviours and values as responsible for internal conflict and feelings of distress (Bardi & Schwartz, 2003; Schwartz, Galperin, & Masters, 1995). For addicts in this study, it may be that pornography use is a behaviour that is incongruent with their values, and for which they lack the cognitive flexibility as a resource to draw upon, to manage their distress. Furthermore, the pursuit of either intrinsic (e.g. stimulation values) or extrinsic (e.g. tradition values) needs or goals has been found to be related to general mental health and life satisfaction (Sagiv & Schwartz, 2000); stimulation-led values have been associated with positive outcomes, and tradition-led values have been associated with negative outcomes. Therefore, it may be that participants in this study differed in the value-led goals they pursued, for instance, addicts may have been more likely to prioritise tradition-led values and non-addicts may have been more likely to prioritise stimulation-led values.

Subjective impact of religious beliefs was found to predict negative effects of pornography on life in general, attitudes towards sex, sex life and negative effects overall and mediate the relationship between frequency of viewing and negative effects of pornography. In line with previous research, which suggests discrepancies between behaviours and values can cause distress and pathologising of behaviours (Musick et al., 2000), perhaps for some participants the strong religious beliefs they hold about pornography and sex more generally, are in conflict with their sexual behaviours. In order to make sense of this, and realign their values and behaviours, they may externalise their pornography use and attribute such behaviours to an addiction. Furthermore, when addiction is conceptualised as "sickness", this might be a psychological mechanism to reduce distress (e.g. "It's not me, it's the illness"). Importantly, if an individual holds a belief that their pornography use is acceptable yet external beliefs that "pornography use is unacceptable" are imposed on them, they may be more likely to experience distress (Bardi & Schwartz, 2003; Sagiv & Schwartz, 2000). In addition then, if an individual relates to other "addicts", then their tendency to externalise their self-worth within this context may be less likely to lead to negative consequences.

We also hypothesised that shame would be associated with how an individual perceived their pornography use, with addicts reporting higher levels of shame, however, this was not supported. To our knowledge, this has not been found in previous research. One explanation for this might be that if individuals externalise their behaviours as being a result of an addiction, rather than internalise them, they are protected from experiencing shame (Lickel, Steele, & Schmader, 2011).

Limitations

Cautions regarding causal inferences apply and there may be other contributing factors, which the current study fails to capture. For instance, research has demonstrated that anxiety and depression are related to cognitive distortions and inflexibility of thought (Moritz, Kloss, von Eckstaedt, & Jelinek, 2009). Therefore, perhaps mental health factors

influence frequency of cognitive distortions and/or whether individuals pathologise their pornography use. Furthermore, findings may be limited with the omission of data regarding meaningful activity; for example, participants who are employed full-time may have less opportunity or less motivation to access online pornography. Therefore, future research may benefit from acquiring such information. In addition, although perhaps reflective of real-world figures, the disparity between the numbers of participants across the three groups may have affected the results and subsequent conclusions. Future research with larger numbers of participants representing pornography addicts would enable this study's hypotheses to be further tested. It should also be noted that the mean age of participants was 28 years old. This peer group is likely to be at a different life stage than older or younger age groups, and as such their relationships with others may be qualitatively different, for example, they may be less likely to be in a committed relationship with a family compared to older adults. Given that research suggests the impact of pornography use on pornography users' relationships is indicative of a perceived addiction (Pyle & Bridges, 2012), this may have influenced the findings.

The current study also identified a population of individuals who are qualitatively different in their beliefs and attitudes from self-defined pornography addicts and non-addicts; "somewhat addicts". For these individuals, perhaps they experience less cognitive dissonance between their values and behaviours in part due to their reduced cognitive distortions and level of religious beliefs. However, over time if they continue to view their behaviours as discrepant from their attitudes, values, or beliefs, they may be at an increased risk of identifying as a pornography addict. By identifying such people in clinical contexts, and working with their thinking styles, we may be able to prevent them from experiencing increased distress. Future research may benefit from employing a qualitative design to draw out the nuanced thinking styles prevalent within pornography users, the values individuals may prioritise, and to gain a better understanding of users' needs, if any, relating to their negative evaluations of pornography use. Furthermore, a qualitative design may allow for similarities and differences in pornography behaviour profiles to be explored in more detail. For instance, collecting information about family and peer discourses around pornography may help elucidate differences (e.g. pornography is a taboo). Finally, if research suggests how we make sense of our behaviours determines our intentions (Hungerman, 2014; Schwartz, 2013; Schwartz & Bardi, 2001), then it would be useful for future research to further explore how individuals, with different addiction status, value the significance of societal and cultural norms as well as gain an understanding of those individuals' beliefs about the causation of pornography addiction.

This study has shown thinking styles to be predictive of how pornography users perceive their pornography use as being problematic or not. These findings have clinical implications as they can inform treatment[6] for individuals who perceive their pornography use as problematic. The dominant approaches to treating pornography addiction are abstinence-based, however, if underlying attitudes, values and thinking styles are not identified as treatment needs and appropriately addressed, individuals may still experience distress and pathologise other subversive, but normal, behaviours. Moreover, in applying abstinent-based interventions, we may be inadvertently perpetuating the belief that pornography use is "wrong". Instead, treatment could aim to increase cognitive flexibility, reduce cognitive distortions and help the individual to evaluate their behaviours without the potential biases cognitive distortions can lead to.

To conclude, current abstinence models of treatment are propagated with limited evidence of effectiveness or evaluation of harm. There is not much focus on cognitive dissonance, but other factors, such as abstinence or behavioural control, are prioritised. Treatment should be based on evidence of what the psychological aetiological factors are. This research provides some evidence of cognitive dissonance being related to how people position themselves. Therefore, treatment may want to focus on this, and see whether this dissonance could be reduced, to improve quality of life for those worried about being addicted to pornography.

Notes

1. As we aimed to explore differences in how people perceived their own behaviours, for the purpose of this study, terms relating to "self-perceived problematic/addictive pornography use" will be used.
2. For ease of reference, participants may be referred to as addicts, somewhat-addicts, and non-addicts in the body of text. This is not to suggest that we subscribe to the notion of an addiction model and refers to the participant's self-identified addiction status.
3. However, we acknowledge that some individuals may not restrict their viewing to only legal or illegal material. At the end of the online survey, participants were presented with the option of participating in a qualitative study (reported in Duffy, Dawson, & das Nair, in prep.).
4. Traditionally, Bonferroni corrections are advised to counteract the Type I error rates that result from carrying out multiple tests, however, many researchers argue that doing so is unnecessary and potentially deleterious to analysis; its interpretation is arbitrary and its performance can reduce power and increase the likelihood of Type II errors (Perneger, 1998). Therefore, we did not perform Bonferroni corrections.
5. Sensitivity analyses were performed with different contrast groups to ensure that overall findings were robust.
6. When using the term "treatment" we are not suggesting that individuals who perceive their pornography use to be problematic are "ill". Instead, this term refers to the *support* that clinicians can offer individuals in helping them to understand that they are not ill, and to help them deal with their distress.

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